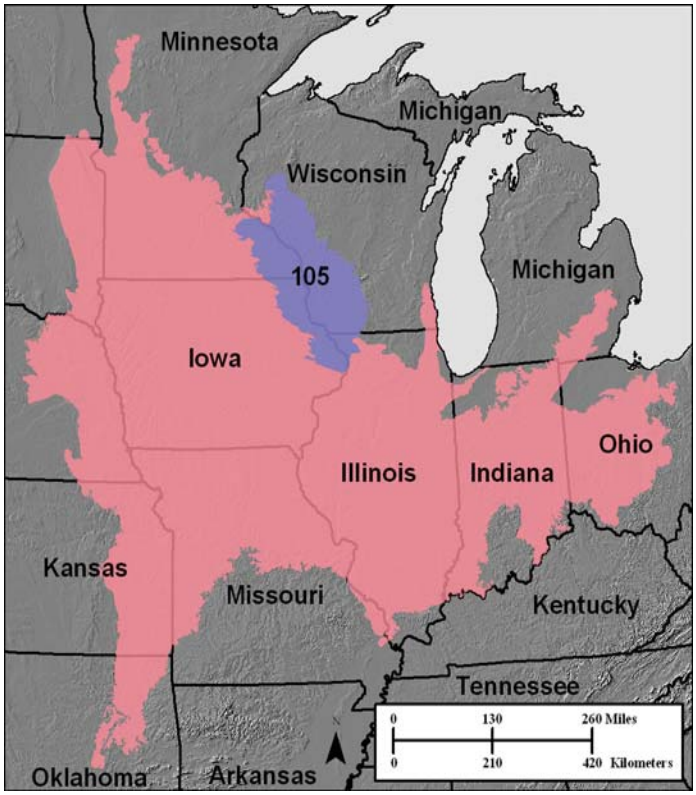

Location of MLRA 105 in Land Resource Region M.

105—Northern Mississippi Valley Loess Hills

This area is in Wisconsin (52 percent), Iowa (23 percent), Minnesota (20 percent), and Illinois (5 percent). It makes up about 17,950 square miles (about 46,515 square kilometers). The major cities or towns in the area are Decorah, Dubuque, Maquoketa, and Clinton, Iowa; Rochester and Winona, Minnesota; and Eau Claire, Menomonie, Prairie du Chien, Platteville, and Richland Center, Wisconsin. Interstate 90 crosses parts of this MLRA. The Savanna Army Depot Military Reservation, along the part of the Mississippi River in Illinois, and the Fort McCoy Military Reservation, in Wisconsin, are in the MLRA. The Richard J. Dorer Memorial State Forest makes up almost the entire northeast one-quarter of the part of this area in Minnesota. Numerous State parks are throughout the area. Much of the Upper Mississippi National Wildlife Refuge is in this MLRA.

Physiography
This area is in the Wisconsin Driftless Section of the Central Lowland Province of the Interior Plains. In Wisconsin, this area is often referred to as the "Driftless Area" because it has undergone only limited landscape formation by glacial ice. The area consists mostly of gently sloping to rolling summits with steeper valley walls that join small to very large flood plains. Scenic landscapes are characteristic of the area. They include deep valleys, abundant rock outcrops, high bluffs, caves, crevices, and sinkholes. Stream valleys are deep, narrow, and V-shaped and have irregular slopes and steep cliffs. The valleys commonly take abrupt, sharp-angled turns, indicating that the local drainage network is controlled by joint patterns in the underlying bedrock. Elevation ranges from 660 feet (200 meters) on the valley floors to 1,310 feet (400 meters) on the highest ridges. Local relief is mainly 10 to 20 feet (3 to 6 meters), but it is as much as 50 to 100 feet (15 to 30 meters) on valley walls along the major streams and is as much as 250 feet (75 meters) on the Mississippi River bluffs above the river valley floor.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Upper Mississippi-Maquoketa-Plum (0706), 38 percent; Upper Mississippi-Black-Root (0704), 33 percent; Wisconsin (0707), 19 percent; Rock (0709), 7 percent; Chippewa (0705), 2 percent; and Upper Mississippi-Iowa-Skunk-Wapsipinicon (0708), 1 percent. The Mississippi River flows through much of this area, forming the boundaries between Minnesota and Wisconsin and between Iowa and Illinois. The Kickapoo, Wisconsin, and Pecatonica Rivers are in the part of this area in Wisconsin. The Zumbro, Whitewater, and Root Rivers flow into the Mississippi River from the part in Minnesota. The Upper Iowa, Turkey, Yellow, Volga, and Maquoketa Rivers all flow into the Mississippi River from the part in Iowa. The Apple, Plum, and Rock Rivers are in the southeast corner of the area, in Illinois.

Geology
This area is in the "Driftless Area" of southwestern Wisconsin, but it shows some evidence of glaciation, especially in the western part. Cambrian sandstone, with some shale and dolomite layers, is exposed in the northern part of the area. The sandstone also underlies Ordovician sediments in the more deeply eroded river valleys. Sandstone, shale, dolomite, and limestone units of the St. Peter Formation and Prairie du Chien Group are at the surface, in road cuts, and in valley walls along the major rivers in the part of the area in Wisconsin and Minnesota. In the southern part of the area, younger Ordovician shale and

dolomite units occur at the surface. Some karst areas have formed where the carbonate rocks are near the surface. Loess deposits cover many of the bedrock units in this area.

Climate
The average annual precipitation in most of this area is 30 to 38 inches (760 to 965 millimeters). Two-thirds or more of the precipitation falls during the freeze-free period. Most of the rainfall occurs as high-intensity, convective thunderstorms during the summer. Snowfall is common in winter. The average annual temperature is 42 to 50 degrees F (6 to 10 degrees C). The freeze-free period averages about 175 days and ranges from 145 to 205 days.

Water
Following are the estimated withdrawals of freshwater by use in this MLRA:
Public supply—surface water, 2.1%; ground water, 4.0%
Livestock—surface water, 0.2%; ground water, 1.2%
Irrigation—surface water, 0.0%; ground water, 0.2%
Other—surface water, 88.2%; ground water, 3.9%

The total withdrawals average 2,650 million gallons per day (10,030 million liters per day). About 9 percent is from ground water sources, and 91 percent is from surface water sources. In most years the moderate precipitation is adequate for crops and forage, but in years of little or no precipitation, yields are reduced on soils that are shallow over bedrock. The many springs, streams, and farm ponds are additional sources of surface water in the area. The surface water is abundant and generally is of good quality. Poor water quality in stream reaches is primarily the result of nonpoint sources of sediment, nutrients, and pesticides from agricultural land or wastewater discharges downstream from the larger cities.

Ground water is abundant in glacial outwash deposits in most of the river valleys in this area. This water is moderately hard or hard but is generally of very good quality. The level of total dissolved solids is typically less than 250 parts per million (milligrams per liter). The supply of ground water varies in the uplands. The sandstone and dolomite layers in the Jordan and Prairie du Chien aquifers usually provide adequate yields to wells. The water from these aquifers is suitable for all uses, although the level of total dissolved solids approaches 1,000 parts per million (milligrams per liter) in some areas.

Soils
The dominant soil orders in this MLRA are Alfisols and Entisols and, to a lesser extent, Mollisols. The soils in the area dominantly have a mesic soil temperature regime, a udic soil moisture regime, and mixed mineralogy. They generally are moderately deep to very deep, well drained or moderately well drained, and loamy. Hapludalfs formed in loess (Downs, Fayette, Mt. Carroll, and Seaton series) or loess over residuum (Dubuque, La Farge, Norden, and Nordness series) on uplands and benches. Paleudalfs (Valton series) formed in loess over residuum on uplands. Argiudolls (Tama series) formed in loess on uplands and terraces. Udifluvents (Chaseburg series) formed in alluvium on flood plains and alluvial fans. Udipsamments (Plainfield series) formed in glaciofluvial deposits on outwash plains, terraces, and valley trains.

Biological Resources
The soils on uplands support native hardwoods. Oak, hickory, and sugar maple are the dominant species. Big bluestem, little bluestem, and scattered oak trees grow on some sites. The soils on lowlands support mixed hardwoods, mainly elm, cottonwood, river birch, ash, silver maple, and willow. Sedge and grass meadows and scattered trees grow on some of the wetter lowlands.
Some of the major wildlife species in this area are white-tailed deer, coyote, gray fox, red fox, beaver, raccoon, skunk, muskrat, opossum, fisher, otter, mink, cottontail, fox squirrel, gray squirrel, red squirrel, Canada goose, sandhill crane, bald eagle, red-shouldered hawk, goshawk, peregrine falcon, osprey, Cooper’s hawk, turkey vulture, turkey, ruffed grouse, woodcock, great horned owl, wood duck, hooded merganser, pileated woodpecker, and red-bellied woodpecker.

Land Use
Following are the various kinds of land use in this MLRA:
Cropland—private, 49%
Grassland—private, 14%; Federal, 1%
Forest—private, 27%
Urban development—private, 4%
Water—private, 2%
Other—private, 2%; Federal, 1%
Nearly all of this area is farmed. About one-half of the area is cropland, and 15 percent is permanent

pasture. Cash crops, such as corn and soybeans, and feed grains and forage crops for dairy cattle and other livestock are the principal crops. About one-fourth of the area, mainly the more sloping parts, consists of farm woodlots used for commercial timber production or for farm products. The Mississippi River and its major tributaries provide opportunities for recreation.

The major resource concerns are water erosion, depletion of organic matter in the soils, and poor water quality. Conservation practices on cropland generally include systems of crop residue management (especially no-till, strip-till, and mulch-till systems), cover crops, nutrient and pest management, contour stripcropping, grassed waterways, terraces, manure management, pasture and hayland planting, tree planting, and grade-stabilization structures.